SPAWAR Depots

2.2 Space and Naval Warfare Systems Command (SPAWAR) Maintenance Depots

At present SPAWAR operates two "organic" depot operations -- one operating on the east coast in Charleston, South Carolina; (Code 62) and one operating on the west coast in San Diego, California (Code D65) -- that perform depot maintenance for electronic systems and equipment. A complex interrelationship exists between the depots of SPAWAR HQ, the Navy Inventory Control Point (NAVICP), and the Federal Industrial Supply Center (FISC). SPAWAR provides depot policy and, in addition, serves as both the Inventory Control Point for 2Z Cog equipment and as Technical Manager and coordinator for the workloading process. NAVICP controls all stock funded equipment and provides necessary requirements, forecasting, funding, and appropriate workload coordination. The FISCs function as receiving/storing/issuing points, while the respective depots provide overhaul, repair, and restoration services. The individual depots are subordinate to the depot manager at SPAWAR HQ in matters relating to repair policies and procedures.

2.2.1 SPAWAR Systems Center Charleston (SPAWARSYSCEN CHAS, CD 63) Engineering Support Facility Division (ESFD) Charleston, South Carolina

The Engineering Support Facility Division (Code 62) conducts depot level maintenance within five support branches. Depot Operations are managed at the division level in Charleston, SC. Depot operation activities are performed at both the Charleston, SC campus facilities and within two facilities in the Tidewater area of Virginia.

2.2.1.1 OVERVIEW

History/Mission:

- The Engineering Support Facility Division (formerly known as the Module Maintenance Facility (MMF) Division) was established at Charleston, SC in 1961 to repair Strategic Systems Programs (SP-23) Fire Control modules. In 1962, the repair activity expanded to include Navigation (SP-24), Launcher (SP-22), and Missile Test and Readiness Equipment (ISP-27).
- In 1985, the Commanding Officer of Strategic System Programs (SSP) informed the MMF that they could seek additional customers to offset a number of declining Navy platforms and higher overhead costs (prior to this, only SSP tactical equipment was allowed). In 1989, SSP allowed trainer (SP-11) repair capability
- In 1993, the MMF acquired Building 237 and warehouse 216 to consolidate material stored in Charleston Naval Shipyard Buildings 69A, 1505, and warehouse 3452 on the South Annex. Beginning FY95, the MMF was transferred from Charleston Naval Shipyard to NISE East, Code 62, due to a 1993 Base Realignment and Closure (BRAC). The ESFD is a unique state-of-the-art electronic, electro-optical facility that can repair circuit cards and complex electronic equipment for the Navy, government, or commercial applications. Since 1961, SSP has relied on the facility to repair/upgrade and refurbish components of the Fleet Ballistic Missile Weapons System (FBMWS) for Polaris and Poseidon programs. The ESFD is now supporting the Strategic Weapons System (SWS) for Trident I and Trident II programs by repairing and delivering a quality product at a substantial cost savings.
- The ESFD currently supports program managers in Space and Naval Warfare Systems Command (SPAWAR) as well as such customers as Naval Sea Systems Command (NAVSEA), Strategic Systems Programs (SSP), Naval Inventory Control Point (NAVICP), United Kingdom (UK), Marine Corp Headquarters, Composite Health Care System, and various other naval activities. The ESFD provides preventive, corrective, and emergency on-site/off-site electronic maintenance for security systems. This maintenance includes technical support, operator training, module repair, fiber optic maintenance, and microcomputer repair. The ESFD is connected to the SPAWARSYSCEN Charleston local area network (LAN) and the World Wide Web, which provides exchange of information throughout the command and the world.

State-of-the-art automated test equipment provides the ESFD the ability to test and repair complex electronic equipment. This provides minimal turn around time, low cost, and high production output.

Location:

- The ESFD is located in North Charleston, South Carolina, on the Cooper River. This was previously Charleston Naval Shipyard. This is approximately five miles north of the historical city of Charleston. Located close to the ESFD are various resorts, gardens, and historical landmarks.

Size:

- The ESFD has an area of approximately 5.6 acres where three buildings are located. The three buildings have a total of 83,600 square feet separated into:

    - 3,000 square feet of office space housing one Division Head, a Maintenance Inter-Service Support Officer (MISO) Office Representative, an Operations Engineer, four Branch Heads, one Instructor, and seven supervisors;
    - An Administrative Facility of 3,000 square feet, which contains a supply and packing area, four restrooms, halls, conference room, LAN room, and a library, electrical closets and a shop planning area;
    - A 49,200 SF laboratory where electronics, hydraulic optical, machines, and gasket fabrication functions are performed. This area also contains an equipment wash room;
    - A warehouse occupying 28,400 square feet.

Work Force/Payroll:

- The ESFD has approximately 109 employees. This includes 70 electronics technicians, 11 optical technicians, 11 quality assurance specialists, 8 miscellaneous positions, plus thirty-one contractors. Total funding is approximately $19 million.

Transportation Access:

- Two major interstate highways (I-26 and I-526), one international airport, one international airport, one Air Force Base, one shipping harbor with piers, an extensive rail system, two small craft airports, three helicopter pads, four highways (US 17, 52, 61, and 701), and bus depots.

Environmental Constraints:

- In addition to those Federal regulations that all DoD installations must comply with, the ESFD must also comply with the following state regulations:

    - South Carolina Pollution Control Act
    - South Carolina Air Pollution Control Regulations
    - South Carolina Hazardous Waste Management Act
    - South Carolina Hazardous Waste Management Regulation
    - South Carolina National Pollutant Discharge Elimination System Permit Regulation

Significant Current Capabilities/Technological Enhancements

- Significant Current Capabilities and Skills: Some of the ESFD's current capabilities include:

    - Electronic systems restoration repair, overhaul, upgrade and installation
    - Reverse engineering
    - Video terminal repair
    - Closed circuit TV camera repair
    - Computer installation/repair
    - Develop procedures for test, certification and calibration
    - Hydraulic valves and actuators overhaul
    - Office equipment repair
    - Cable fabrication
    - Gasket fabrication
    - Security systems installation, fiber optic repair, corrective maintenance, preventive maintenance, and training for arms, ammunition & explosive (AA&E), Marine Corps Air Station and high level government buildings
    - Fire Control Optical Alignment Group (OAG)
    - Trident II thermal printer
    - Ships binoculars
    - Theodolites
    - Forward looking infrared (FLIR)
    - AutoCAD
    - Computerized engraving

These are implemented by skills in soldering, wire-wrap, gold plating, crimping, electro-static discharge (ESD), and hazardous material handling.

- Quality Assurance Branch capabilities include:

    - Inspection of incoming repair/replacement parts
    - Screening system stock
    - Maintaining control of hazardous materials
    - Visual and final inspection of all SSP modules
    - Configuration control
    - Destination inspection
    - Mercury screening
    - Bar coding and labeling
    - Repackaging of hazardous material
    - Generate reports
    - Conduct internal and external audits and follow-up corrective action

- The packaging area performs packaging in accordance with MIL-P-2073 and NAVICP 4030.4. Packers are certified in Performance Oriented Packaging (POPS).

- The training area conducts training on wiring and soldering techniques, Surface Mount Technology (SMT), soldering, solderless connections (crimping), wire-wrap, electro-static discharge (ESD) control, measuring and testing equipment (MTE) certification, gold plating, emergency control (lockout/tagout), hazardous material communication, quality assurance standards, and introduction to computers.

- A complete machine shop exists along with multi-craft tiger teams for installations/ripouts.

All SSP work is tracked using the Automated Repair Tracking System (ARTS) using the Advanced Revelation database. Other specialized databases exist according to customer requests.

2.2.1.2 TECHNOLOGICAL ENHANCEMENTS:

ADP:

- The ESFD is updating all PCs to state-of-the-art audio/visual components. This will allow the ESFD to utilize numerous network platforms. The ESFD is now capable of operating on Unix, Novell, and Banyan Vines network operating systems.

- Automatic Fault Detection Enhancements: The ESFD has ordered the HUNTRON Tracker Model 5100DS. Using the power of a PC, the Huntron makes testing electronic components quick and easy. Digital storage means it never forgets test data. It will also allow you to share data with other tracker equipment technicians. This will allow the ESFD to economically create test routines for low volumes, wide varieties and inadequately documented printed circuit boards. The 5100DS digitizes the analog signature and the computer reads, compares and stores the information digitally for instant recall for future work.

- Automatic Test Equipment (ATE): The ESFD has purchased the Schlumberger S645 - VME Test Station. The Schlumberger can test digital boards, analog boards and a combination of both. The tester has an electronic library of thousands of ICs. If a certain IC is not listed, a program can be written and loaded in to the computer.

- The PRC 2000 Process Control System from PACE is used for component replacement. This is a microprocessor-controlled workstation with all accessories needed to remove faulty components. The PRC 2000 is capable of through-hole and Surface Mount Technology (SMT). Training is available for civilians and military personnel.

- The ESFD has also purchased the Hewlett Packard VXI platform, which includes the VME (Versa Module Eurocard buss or IEEE #488) extension. The IEEE interface makes it easy to control and collect data from instruments. The VXI accepts large modules and backplanes that provide better electrical shielding. Additional pins on the backplane are defined that provide

additional power supplies, triggering lines, clock signals, and local bus lines, thus allowing modules to communicate with each other.

- The ATE listed above will enable the ESFD to trouble-shoot and repair the latest state-of-the-art microminiature technology into the future. This will also allow the ESFD to maintain fewer test sets and decreases time to repair failed units.

- Calibration Laboratory – The Calibration Laboratory provides calibration services to SSCC, Charleston Naval Weapons Station, Nuclear Power Training Unit, Nuclear Power Training School, Mobile Mine Assembly Groups, NSWC, and various other DoD customers.

  The Electrical/Electronic section of the Calibration Laboratory has the capability to calibrate Alternating and Direct Current (AC and DC) voltage and current generating and measuring instruments, as well as resistance, capacitance and inductance bridges. In the area of radio frequency measurements, the Calibration Laboratory calibrates instruments that generate and/or measure power, frequency, attenuation, frequency, amplitude, and modulation. The calibration Laboratory also provides services to calibrate microwave instruments to 26.5 Ghz with limited capability to 40 Ghz.

- Module Test and Repair (MTR) work centers

  - Miniature/micro miniature (ZM) station
  - Trained & certified technicians (ZM & MTR)
  - AN/USM-646 (V) Electronic Test Station (Gold Disc)
  - Gold Disk Developers

- Electrostatic Discharge Prevention Enhancements - SPAWARSYSCEN Charleston ESFD continually upgrades their electrostatic prevention techniques thereby increasing the percentage of the depot that is part of the ESD envelope. All packaging materials and processes are reviewed and proper prevention methods implemented as necessary. This enhanced attention to potential ESD problems associated with today's circuits eliminates the risk of ESD damage to assets throughout the overhaul process.

- Precise Time and Time Interval (PTTI) Facility (Code 6233), St. Juliens Creek Portsmouth, VA – The PTTI Facility provides repair, overhaul, and engineering support for all Frequency and Cesium Time Standards. Customers include all of DOD excluding the Air Force. This facility is the repository for all spare Navy assets. Operational units are shipped on short notice to anywhere in the world.

2.2.1.3 COMMODITIES AND PRODUCTS

Aircraft

Avionics

Automotive Equipment

Communications
Electronics

Combat Vehicles

Communications
Fire Control

Communications/Electronics

Accessories and Components
Electronics
General Purpose
Radar

General Support Equipment

Electronic Test Equipment

Ships

Communications & Electronics
Fire Control

2.2.1.4 PROCESSES AND TECHNOLOGIES

Fabrication/Repair

CAD/CAM
- Artwork-Flat Wire Cables
- Artwork-Printed Circuit Board
- CNC & NC Programming
- Drilling/Lathe/Punch
- Engineering Analysis
- Engineering Design/Drawings
- Forming/Machining/Milling
- Plate Cutting
- Printed Circuit Board
- Sheetmetal

Certified Soldering
CNC Forming/Machining/Milling
Cutting – Oxyfuel
Electrical Systems
Electronic ATE
Eprom/Prom Programming
Hybrid Microcircuit

Machining
Metal Finishing
Milling
Optics
Printed Circuit Board
Test Program Sets
Tool and Die
Wiring Harness

Test and Inspection

Calibration
Electronic ATE – Analog
Electronic ATE – Digital
Electronic ATE – Ditmco
Electronic ATE – GenRad
Electrostatic Discharge
Fiber Optics
Hydraulic Systems
Spectrographic Analysis

2.2.2 Space and Naval Warfare Systems Center (SPAWARSYSCEN) Systems Support Engineering Division, San Diego

2.2.2.1 OVERVIEW:

History/Mission:

- In 1966, the Naval Electronics Systems Engineering Activity (NAVELEXENGACT), Southwest Division established an 80-man calibration and repair shop at the Taylor Street facility in San Diego. Since that time, the facility has changed names from NAVELEXENGACT, NAVELEXENGCEN, NCCOSC In-Service Engineering, West (NISE West), and is known today as the SPAWARSYSCEN San Diego Depot located in Building 1 Old Town Campus.
- Through these 30 years, there has been one overriding mission: to provide depot-level support for a variety of communications/navigation/electronic equipment to DoD users.
- The depot is the major SPAWAR maintenance depot activity.
- The operation encompasses facilities that enable it to serve as Designated Overhaul Point (DOP) and repair facility for assigned repairables, i.e. assemblies, modules, and printed circuit boards drawn from electronics warfare special communications, Teletype, RADIAC, CRYPTO, and C4I systems and equipment.
- Included in the depot's tasking is responsibility for installation of field changes and engineering change orders, system and module testing, fabrication, modification and repair/overhaul services for SPAWARSYSCOM, NAVICP, NAVSEASYSCOM, NAVAIRSYSCOM, NSA (CRYPTO systems), NCR (RADIAC) interservice, foreign military, and Naval fleet and shore commands.
- The Depot develops and performs operational certification of Test Program Sets (STPs), Technical Repair Standards (TRS), and repair procedures. The personnel also evaluate hardware, software, and procedures for Automated Test Equipment (ATE) used in the depot for support of assigned repairable, modules, and systems.
- The depot provides acquisition, technical, logistics, and maintenance support services for a wide range of multi-service communications, electronics, and cryptographic systems. Some of these services include:

    - System Test and Evaluation
    - Advanced Test Technology Assessment
    - ATE System development and acquisition
    - CASS expertise
    - NDI/COTS supportability
    - In-service Engineering Agent
    - Service Life Extension
    - Certified Soldering Surface Mount Technology (SMT)
    - Composite Material repair
    - Corrosion mitigation and restoration
    - ESM/ECM systems repair
    - ELF to EHF equipment/systems repair
    - GPETE/SPETE repair and calibration from DC to 40Ghz
    - Printed Circuit Board (PCB) repair

- IFF system overhaul and maintenance
- TACAN system restoration
- Power supply repair/overhaul
- Teletype equipment repair/overhaul
- GPS repair/overhaul
- C41SR System Operational Verification testing (SOVT)
- Interoperability testing
- Repair, overhaul, and manufacture of electronic equipment
- Instrument calibration and repair
- Mechanical calibration
- Stress and vibration screening
- Ship and site surveys and technical assistance visits
- Technical training facilities and equipment support
- Cryptographic repair facility
- RADIAC calibration laboratory
- Overhaul, modification, and restoration
- Direct Navy, Coast Guard, and Reserve support
- Multi-service DMISA workloading

Location:

- The SPAWARSYSCEN San Diego Depot is strategically located in southern California, at San Diego. San Diego boasts a large, sheltered deep-water harbor wherein a large segment of the US Pacific Fleet is based.
- Major military airfields of NAS North Island (patrol and anti-submarine warfare (ASW) aircraft basing) and NAS Miramar (fighter, helicopter, and airborne early warning (AEW) aircraft basing) are there, with the latter being capable of operating large cargo aircraft such as the C-141, and C-5 series Air Mobility Command (AMC) transports.
- Rail service is provided by the ATSF Railroad (freight service only) and AMTRAC (passenger service only) to Los Angeles, a distance of approximately 120 miles north.
- Los Angeles forms the hub of a rail network permitting access to San Diego from the rest of the country.
- The interstate highway network is represented in San Diego by the junction of I-5, I-15, I-805, and I-8 within the city limits. This snapshot of San Diego's transportation capabilities underscores its importance as a logistic center.
- The proximity of the depot to NSC San Diego serves to further reduce the transit time for those modules and components for which SPAWARSYSCEN San Diego is the DOP.

Size:

- The depot has grown from a small 80-man calibration and repair shop in 1966 to a 100,000 square foot complex located at Air Force Plant 19 on Pacific Coast Highway, a 7,000 square foot complex at the NAVSTA San Diego and a new 4,000 square foot complex at Battery Ashburn Point Loma.

Work Force/Payroll:

- Approximately 275 people are employed to perform the depot maintenance mission, with a payroll of $18.5 million.

Transportation Access:

- Access includes a large deep-water port, major military airfields, and an international airport, major highways (I-5, I-8, I-15, I-805), major rail carriers, and a variety of motor freight carriers as well as proximity to the major Navy stock points in San Diego.

Environmental Constraints:

- The Depot does not operate under any environmental constraints.

2.2.2.2 TECHNOLOGICAL ENHANCEMENTS:

- **Significant Capabilities:** SPAWARSYSCEN San Diego serves as the Navy prototype depot for Environmental Stress screening (ESS) on the TRIDENT class submarine electronics surveillance measurements (ESM) Systems. It is also the Center of excellence for (1) submarine ESM overhaul, (2) C4I equipment overhaul, and (3) CASS. In addition it is the only Primary CRF in the US Navy.
- SPAWARSYSCEN San Diego is implementing new sealing and coating technologies, including the extensive use of Triglycidylisocyamurate (TGIC) Powder Coating. The TGIC powder coating is a polymer that is applied to an electrically conductive part as an electrostatic system applies powder. The part is then subjected to an elevated temperature of around 350 degrees F and the powder melts to form a uniform film over the part that is about 0.005 inches thick. The material is a polyester resin that is flexible and has extremely good UV and moisture resistance. In other words, it's pretty bullet proof for a long time. Utilization of these new corrosion prevention techniques has dramatically reduced corrosion and extended the useful life of many systems.

2.2.2.3 COMMODITIES AND PRODUCTS

Aircraft

Accessories and Components
Avionics
General Purpose
Support Equipment

Automotive Equipment

Communication
Electronics

Combat Vehicles

Communications
Fire Control
Support Equipment

Communications/Electronics

Accessories and Components
Electronics
General Purpose
Power Plants GTE
Power Plants Recip
Radar
Shelter/Housing
Support Equipment

Construction Equipment

Accessories and Components
Communications
Electronics
Engine
Hull & Chassis

General Support Equipment

Electronic Test Equipment

Ships

Communications & Electronics
Fire Control

2.2.2.4 PROCESSES AND TECHNOLOGIES

Cleaning/Stripping

Abrasive Flow
Agricultural Media Blast
Flash Paint Removal
Glass Media Blast

Cleaning/Stripping

Hydroblast
Micro Blast
Steam
Ultrasonic
Water Jet

Fabrication/Repair

CAD/CAM
- Artwork-Flat Wire Cables
- Artwork-Printed Circuit Board
- CNC & NC Programming
- Drilling/Lathe/Punch
- Engineering Analysis
- Engineering Design/Drawings
- Machining/Milling
- Plate Cutting
- Printed Circuit Board
- Sheetmetal

Ceramics
Certified Soldering
CNC Forming/Machining/Milling
Coaxial Cables
Communications Interface Devices
Cryptographic
Cutting - Oxyfuel
Electrical Systems
Eprom/Prom Programming
Hybrid Microcircuits
Machining/Milling
Metal Finishing
Metrological
Printed Circuit Board
Robotic Painting

Cleaning/Stripping

Grit Blast
Hazardous Chemicals
Non-Hazardous Chemicals
Sand Blast

Test and Inspection

Anechoic Antenna Test Chamber
Antenna Test Range
Bonding Test
Calibration
Electron Microscope
Electronic ATE - Analog
Electronic ATE - Digital
Electronic ATE - Ditmco
Electronic ATE – GenRad
Electrostatic Discharge
Environmental Vibration
Fiber Optics
Hydraulic Systems
Spectrographic Analysis
Stress
Tempest Test
Video Inspection Probe

Test Program Sets
Tool and Die
Welding - Arc
Welding – TIG, MIG
Wiring Harness